8 December 1999

Interim Structural and Operational Plan

For Hydrologic Compliance with the

Cape Sable Seaside Sparrow Biological Opinion

for the Year 2000

Prepared by the U.S. Army Corps of Engineers
For the
U.S. Fish and Wildlife Service

INTRODUCTION

As presented in the Cape Sable Seaside Sparrow (CSSS) Biological Opinion dated February 19, 1999, changes from the existing rules of operations for the southern portion of the Central and Southern Florida (C&SF) project are needed to avoid jeopardizing the CSSS. A reasonable and prudent alternative to achieve the goals of the BO was presented along with specific terms and conditions needed for compliance. In general, the RPA requires that: (1) By March 1, 1999, a minimum amount of sparrow habitat be protected from unusually high or low water levels; (2) By May 1, 1999, a fire management strategy be initiated; (3) Between March 1, 2000, and 2003, incrementally increase protections from unusually high or low water levels; and (4) Annual reports must be submitted to the Service detailing progress implementing the reasonable and prudent alternative. Reasonable and prudent measures and terms and conditions designed to minimize incidental take of listed species, and conservation recommendations designed to benefit listed species, were also presented. Specific targets were presented for each sparrow sub-population listed in the Biological Opinion (BO).

This report details actions consistent with the requirements of the RPA of the BO for the year 2000 for each of the listed sparrow subpopulations. The actions presented herein are directly linked to hydrologic conditions as affected by the operation of the C&SF Project. This plan includes the actions contained herein as may be modified by further modeling and/or testing and monitoring through coordination with the US Fish and Wildlife Service and others as deemed appropriate. The plan for deviations from current operations will continue to play a key role in meeting the goals and objectives of the BO. The current and future deviations are discussed later in this report.

BACKGROUND

Overall this has been one of the wettest wet seasons on record for South Florida. The most dramatic weather event to affect the operation of the C&SF Project during 1999 was Hurricane Irene. Near historic high water levels in Water Conservation Areas 2A, 3A and 3B were observed. The unusually high stages in Water Conservation Areas 2A, 3A, and 3B add to the difficulty in providing the specified 60-day dry period for subpopulation A during the year 2000.

Over the next 4 months, La Nina conditions are expected to continue in Florida. La Nina conditions are forecast to produce greater than normal chance for below normal rainfall from December through March 2000. A drying trend has been noted for northern Florida and appears to be spreading southward. While the drying trend is good news for subpopulation A, it is likely not to occur fast enough to allow for early closure of the S-343s, S-344, and S-12s under current operating criteria (as discussed in next section). Without a plan for early cutbacks from WCA 3A, the regulatory releases would not likely end until well into the nesting season.

Discussion of Current Project Conditions and Operations

The level of Lake Okeechobee reached Zone B briefly during October and had receded to Zone D by mid-November. Consequently, regulatory releases were passed to the St. Lucie and Caloosahatchee estuaries. For the most part, during this wet season, high stages in the water conservation areas prevented the passing of regulatory releases to the south except to WCA 1. Lake Okeechobee stages are currently in Zone D, still about 0.66 ft. above the regulation schedule. Therefore, high lake stages are not expected to adversely affect the year 2000 operations for the southern portion of the system. With the La Nina potential, it may be desirable to save some extra water in Lake Okeechobee for water supply and in-lake benefits.

WCA 1 was in regulatory Zone A in October. Water levels in WCA 1 are receding and water from Lake Okeechobee has been passed through WCA 1. Water levels in WCA 2A are very high and reached near historic levels in October. A temporary deviation from normal operations was requested and approved to prevent large releases from entering WCA 3A via the S-11 structures. This deviation provides for holding higher water levels in WCA 2A in order to reduce discharges to WCA 3A due to the very high water levels in WCA 3A. The S-11 structures are now closed with water being released to tide maximized as capacity is available. WCA 3A also reached near historic high water levels as a result of rainfall and resulting inflows caused by Hurricane Irene – about 1.5 feet higher than any of the previous 3 years. High water conditions in WCA 3B had already required closing the L-67 A levee gap in early September of 1999. The continued high water in WCA 3B makes it impractical to consider gapping the L-67 levees at this time. The high stages in WCA 3B also preclude the use of S-151 to remove water from WCA 3A at this time. Consequently, the only significant way to reduce the stages in WCA 3A is to send water southward through S-343A and B, S-344, and S-12A-D. The operation of S-343 A and B, S-344, S-12A and S-12B represent a greater combined release capacity than S-333 and they have the most potential direct adverse high stage influence on the subpopulation A region.

Water levels throughout Shark Slough, as well as most of ENP, also reached period of record maximums as a result of Hurricane Irene rainfall. Water levels at NP-205 reached a period of record maximum of 8.35 feet (equal to the previous peak during October 1995). Hurricane Irene rainfall and continuing high releases from WCA 3A have slowed water level recession rates impacting our ability to meet the February 19 Biological Opinion RPA targets. Discharges from WCA 3A have continued at maximum rates through the S-343's, S-344, and S-12 structures to remove this excess water.

Water levels in Northeast Shark Slough, as measured at a gage located in the East Everglades, G-3273, are used to indicate when S-333 may be opened. The trigger water level at G-3273 is 6.8 ft. S-333 is currently closed because G-3273 is above the trigger. No releases have been made to Northeast Shark River Slough since July due to the high water conditions. Current forecasts indicate it may be opened by late December if current recession rates continue. In Northeast Shark River Slough, for the period of

record at G-3273, 1984 to the present, record high stages were observed as a result of Hurricane Irene.

The period of record maximum at G-596 (within the 8.5 SMA) from 1949 to the present reached 8.37 ft in October 1994. The previous high of 8.27 ft occurred in November 1960. After Hurricane Irene, the high stage at G-596 was 8.27 ft. The intense rainfall associated with Hurricane Irene caused widespread flooding in this area.

The effects of Hurricane Irene have been a mixed blessing for the Cape Sable seaside sparrow subpopulations. In the eastern marl prairies, the wet conditions have substantially reduced the fire risk to the eastern subpopulations. However, the wet conditions in the western habitat area resulting from Hurricane Irene as evidenced by the sharp rise at NP-205 increase the difficulty in providing a dry nesting season for subpopulation A to the west.

Planning Assumptions

The Interim Structural and Operational Plan (ISOP), as presented in this report, includes the following assumptions:

1. The actions described in this document apply directly to the year 2000 requirements. Actions for years beyond 2000 are being formulated in another effort and may include actions contained herein.
2. The plan as defined below, is a result of consideration of numerous options to meet the requirements of the BO related to the protection of the CSSS.
3. This report details the specific actions to be taken for the year 2000 along with the time table for implementing those actions as well as a discussion of how these actions are consistent with the requirements of the BO.
4. Information from additional testing, monitoring, and modeling may be used to refine these actions based on any change in weather or other conditions that may affect the overall performance of this plan. Such changes will be fully coordinated with the FWS and others as deemed appropriate prior to implementation.
5. Operational changes alone are not sufficient to fully meet reasonable and prudent alternative requirements. The plan presented in this report includes structural components as well as operational changes to address all of the requirements.

PROPOSED PLAN FOR YEAR 2000

The Cape Sable Seaside Sparrow Biological Opinion provides the reasonable and prudent alternative to preclude jeopardy to the sparrow. The Opinion states in part:

> By March 1, 2000, the Corps must prevent water levels from exceeding 6.0 feet NGVD for a minimum of 60 consecutive days between March 1 and July 15 for the western population as measured at NP 205. For the eastern subpopulations,

the Corps must implement actions that would produce hydroperiods and water levels equal to or greater than those that would be produced by implementing the exact provisions of Test 7, Phase II of the Experimental Program, while passing at least 30 percent of all regulatory water releases crossing Tamiami Trail to the east of the L-67 extension.

The actions described below address specifically what is to be done to achieve consistency with the RPA of the BO, as stated above. To identify the impact of these actions, each of the subpopulations (A, C, E, and F) for which water management targets are specified in the RPA are discussed along with the specific actions being taken for that subpopulation and the anticipated impacts. A schedule for expected implementation is provided on page 12.

Geographically and hydrologically speaking, the sparrow subpopulation regions are distinct. This is true even for the eastern subpopulations. For example, the C, D, and F subpopulations are adjacent to the canals on the eastern side of the ENP while the subpopulation E is only adjacent to Shark River Slough and subpopulation B is adjacent to Taylor Slough. Subpopulation F is directly affected by the L-31N canal levels; whereas, hydrologic conditions in subpopulation C is dominated by the L-31W canal conditions and subpopulation D is dominated by operation of C-111. Therefore, the specific actions for each subpopulation will be discussed separately.

Actions for the Western Marl Prairies, Subpopulation A

RPA Target:

Prevent water levels at NP-205 from exceeding 6.0 feet NGVD for a minimum of 60 consecutive days between March 1 and July 15, 2000.

General Discussion:

As indicated in the discussions of weather and current project conditions, the high water created by Irene in the water conservation areas has resulted in high releases through the S-343s, S-344 and the S-12s. S-333 has been closed to date while the high stages at G-3273 subside. With the beginnings of La Nina conditions, the best chance for a successful 60-day nesting season begins on or about the first of April. In order to enhance the dry-out, several specific actions from the above list are included. The general rationale for the actions is to initiate a dry-out for the subpopulation A by curtailing water releases into the area.

Specific Actions:

The regulation schedule for WCA 3A will be modified to allow closure of … The initial actions include the closing of the S-343's, S-344, and S-12A as soon as possible, by 15 December. This action will be followed within two weeks by the closing of S-12

B. To help offset the slow down in the recession rate of WCA 3A due to the early closures, S-12 C and D would be left open to the extent possible based on further analysis of the recession rate at NP-205 consistent with achieving a level of 6.0 feet by 1 March. Additionally, the culverts along the Tram Road would be blocked and some of the seepage across the Tram Road may be back pumped from the western side to the eastern side (or southward) as long as high stages persist south of S-12 C and D. If water levels exceed the Tram Road elevation in low spots, these areas would be sandbagged to prevent water from flowing across the road into the CSSS area. Without the actions along the Tram Road, water released from S-12 C or D would result in higher stages and a potential slowing of the recession rate in the subpopulation A region.

The regulatory stage for WCA 3A will be modified so that some additional storage may be created in WCA 3A in the dry season to offset potential stage increases later in the breeding season. This would be done by lowering the upper level of Zone E in WCA 3A by 0.50 feet. This is similar to the deviation used in the spring of 1999. By continuing the operation of S-12 C and D and S-333, additional storage is gained in WCA 3A to help offset the reduction in outflow capacity during the nesting season. This action would help increase flexibility to keep S-12 A & B closed until the end of the nesting season.

Note:

In order to achieve dry conditions for subpopulation A, the outflow from WCA 3A needs to be reduced before the levels in WCA 3A are below existing regulatory zones. Reducing the outflow from WCA 3A before Zone E is achieved prolongs the period in the regulatory zones for WCA 3A. Therefore, there is an increase in the time when 30 percent of the regulatory release should come from S-333 after March 1, 2000. Thus, by starting the early dry down for subpopulation A, the 30 percent requirement after March 1, 2000, would be extended for the current high-water condition. Hydrologic records indicate that once the nesting season ends, and throughout the wet season, the requirement of 30 percent of the regulatory releases to NESRS cannot be reliably met with the trigger elevation of 6.8 ft-NGVD at G-3273. However, through modification of the plan for the south Dade conveyance system (as described later) this concern should be addressed.

Expectation Summary:

Modeling has demonstrated that using S-12 C and D can increase the stages at NP-205 impacting our ability to meet targets at NP-205. In the past, the blockage of culverts under the Tram Road has been moderately successful. To increase the effectiveness of this action, small pumps will be placed along the road to pump water eastward across the road. These actions should minimize the effect of continuing to operate S-12 C and D on subpopulation A. Additionally, the early closing of S-12 A and B, will result in improved draw down conditions in the subpopulation A region by March 1, 2000. The combination of early draw down efforts will significantly increase the success potential of the 60-day dry period for subpopulation A. Keeping the S-12 C and

D structures open during the nesting season, to the extent they can be kept open and still achieve consistency with the BO, will help minimize damaging high stages in WCA 3A. The recession rate at NP-205 will be monitored to determine the closure timetable for S-12C&D based on the 1 March target.

Opening the S-333 structure the early part of January, 2000, will result in an increased flow to northeast Shark River Slough and a slightly increased draw down rate in WCA 3A. Assuming no significant rainfall over the next few months (given La Nina conditions and the start of the dry season), releases from the S-333 could help reduce the stage in WCA 3A about 3 inches by March 1, 2000. As conceived in the modified plan for the south Dade conveyance system, the S-333 would remain open up to the maximum capacity from early January 2000 through March 1. However, the S-333 release will not affect the dry out rate in the subpopulation A.

Because of the wet conditions created by Hurricane Irene and continuing S-12 operations, a delayed dry out at NP-205 is likely. The proposed structural and operational actions are necessary to address the requirements for a 60-day nesting season. We believe that absent extraordinary rainfall, the proposed actions to initiate an early dry out in subpopulation A can lead to a 60-day nesting season in the year 2000.

Actions for the Eastern Marl Prairies, Subpopulation C

RPA Targets:

Implement actions that would produce hydropatterns and water levels in the vicinity of Cape Sable seaside sparrow subpopulation C equal to or greater than those that would be produced by implementing the exact provisions of Test 7, Phase II as described in the Final EA for Test 7.

Ensure that at least 30 percent of all regulatory water releases (described as the "supplemental regulatory component" in appendix C of the Final EA for Test 7) crossing Tamiami Trail enter ENP east of the L-67 Extension or provide the hydrologic equivalent in the vicinity of the subpopulation C[1]. This target must be measured and met weekly.

General Discussion:

Current groundwater models, as well as the South Florida Water Management Model (2x2), will be used to determine hydrologic equivalency of the proposed plan. There is no known problem with the implementation of the exact Test 7, Phase II provisions for subpopulation C. However, the Biological Opinion requires that S-332D be limited to 165 cfs, not 500 cfs, during the nesting season. This reduction is currently under evaluation. The hydrologic effect of Test 7, Phase II, both with and without the 30 percent requirement at S-333, is currently being modeled to determine what changes, if any, are predicted.

[1] Fish and Wildlife Service has indicated the acceptance of the "hydrologic equivalence" as reasonable.

Because subpopulation C is located adjacent to L-31W and several miles from the Shark River Slough, the canal levels are expected to have more of an impact on the subpopulation hydrology than slough levels. For that reason, the rationale for improving the hydropatterns in subpopulation C is primarily based upon management of canal levels. If providing Test 7, Phase II conditions are not sufficient during times when S-333 would not be able to provide 30 percent of regulatory flows, more water could be delivered to the region via the L-31N canal.

Specific Actions:

- Implement actions that would produce hydropatterns and water levels in the vicinity of Cape Sable seaside sparrow subpopulation C equal to or greater than those that would be produced by implementing the exact provisions of Test 7, Phase II as described in the Final EA for Test 7 by 1 March 2000.

- Begin pumping at S-332D by 28 December.

- Operate S-333 and/or S-355 to provide at least 30 percent of regulatory flows, when possible, into Northeast Shark River Slough.

- Meet the intent of the 30 percent requirement by providing additional water from the water conservation areas (via S-333 and S-355s) to subpopulations C by bringing water down L-31N for delivery, if needed.

Expectation Summary:

The wet conditions during the fall of 1999, had positive impact on reducing the fire hazard. Additionally, the hydrologic conditions desired at subpopulation C are expected to be met for the year 2000.

Actions for the Eastern Marl Prairies, Subpopulation E

RPA Targets:

Implement actions that would produce hydropatterns and water levels in the vicinity of Cape Sable seaside sparrow subpopulations E equal to or greater than those that would be produced by implementing the exact provisions of Test 7, Phase II as described in the Final EA for Test 7.

Ensure that at least 30 percent of all regulatory water releases (described as the "supplemental regulatory component" in appendix C of the Final EA for Test 7) crossing Tamiami Trail enter ENP east of the L-67 Extension or provide the hydrologic equivalent in the vicinity of the subpopulation E. This target must be measured and met weekly.

General Discussion:

As noted in the general discussion of subpopulation C, the Test 7, Phase II criteria, or its hydrologic equivalence in the sparrow habitats, will be implemented by March 1, 2000. However, because the location of subpopulation E is immediately adjacent to Shark River Slough and several miles from the L-31N canal, the stages in the slough dominate the hydrologic conditions of the subpopulation.

Three approaches are possible that can affect the hydrologic conditions in subpopulation E: deliver water into Northeast Shark River Slough via S-333 and S-355's; deliver water to L-31N via S-333, S-355's and S-334; or increase the flows delivered down the L-67 Extension canal. For the year 2000, all three approaches are considered valid – depending upon the specific hydrologic conditions at any given time. However, modeling to date shows that Test 7, Phase II changes have no significant effect on the hydrology of subpopulation E. If there is little or no direct response between S-333 flows and G-3273 as noted by the ENP[2], there is likely to be no relationship to subpopulation E (which is located several miles to the southwest of G-3273). Therefore, the rationale for improving the hydrology in subpopulation E (when S-333 cannot provide the 30 percent of regulatory flows) is to deliver increased flows via the L-67 Extension canal. Additionally, the temporary pump and buffer area plan will introduce additional water into the area that is drawn from L-31 N. This should have a positive effect equal to or greater than that proposed under the BO.

Specific Actions:

- Implement actions that would produce hydropatterns and water levels in the vicinity of Cape Sable seaside sparrow subpopulation C equal to or greater than those that would be produced by implementing the exact provisions of Test 7, Phase II as described in the Final EA for Test 7 by 1 March 2000.

- Operate S-333 and/or S-355 to provide at least 30 percent of regulatory flows, when possible, into Northeast Shark River Slough.

- Meet the intent of the 30 percent requirement by providing additional water from the water conservation areas (via S-333 and S-355s) to subpopulations C by bringing water down L-31N for delivery, if needed.

- Increase the flow from the end of the L-67 Extension canal when S-333 must be closed due to high stages. This involves opening S-346 and S-347 along the canal and possibly cleaning out any deposition blocking the canal flow. Normally the canal is opened only during low flow periods to deliver water directly to Shark River Slough. However, this action is expected to have direct positive hydropattern benefits to subpopulation E which is located directly south and slightly west of the end of L-67 Extension canal.

[2] Everglades National Park, 1995, A Hydrologic Evaluation of the Experimental Water Deliveries to Everglades National Park Test 6 Iteration.

Expectation Summary:

The wet conditions during the fall of 1999, had positive impact on reducing the fire hazard. Additionally, the hydrologic conditions desired at subpopulation E are expected to be met for the 2000 season.

Actions for the Eastern Marl Prairies, Subpopulations F

RPA Targets:

Implement actions that would produce hydropatterns and water levels in the vicinity of Cape Sable seaside sparrow subpopulation F equal to or greater than those that would be produced by implementing the exact provisions of Test 7, Phase II as described in the Final EA for Test 7.

Ensure that at least 30 percent of all regulatory water releases (described as the "supplemental regulatory component" in appendix C of the Final EA for Test 7) crossing Tamiami Trail enter ENP east of the L-67 Extension or provide the hydrologic equivalent in the vicinity of the subpopulation F. This target must be measured and met weekly.

General Discussion:

Current groundwater models, as well as the South Florida Water Management Model (2x2), will be used to determine hydrologic equivalency if the exact provisions of Test 7, Phase II are not used.

It is expected that the western side of subpopulation F will be affected by flows pumped over the L-67 Extension levee. However, preliminary modeling shows that subpopulation F (especially the eastern side) is highly influenced by Test 7 Phase II changes. Subpopulation F could be more directly affected by pumping from the canal directly into the region. The rationale for providing the proper hydrologic conditions for subpopulation F is primarily related to water delivered via S-333, S355, and S334 to L-31N.

Specific Actions:

- Implement actions that would produce hydropatterns and water levels in the vicinity of Cape Sable seaside sparrow subpopulation F equal to or greater than those that would be produced by implementing the exact provisions of Test 7, Phase II as described in the Final EA for Test 7 by 1 March 2000.

- Operate S-333 and/or S-355 to provide at least 30 percent of regulatory flows, when possible, into Northeast Shark River Slough.

- Meet the intent of the 30 percent requirement by providing additional water from the water conservation areas (via S-333 and S-355s) to subpopulations F by bringing water down L-31N and pumping directly into the region when S-333 must be closed.

- Model impacts and effects of pumping across L-67 Extension Levee and install a pump if feasible and effective.

Expectation Summary:

The wet conditions during the fall of 1999, had positive impact on reducing the fire hazard. Additionally, the hydrologic conditions desired at subpopulation F are expected to be met for the 2000 season.

SPECIFIC DEVIATIONS FROM NORMAL OPERATIONS

A temporary deviation for the WCA 2A regulation schedule was requested and approved to prevent large releases from entering WCA 3A via the S-11 structures. The change raises the upper limit of the regulation schedule to allow water to be held back in WCA-2A. Water releases to tide, via the LEC, are being maximized as capacity is available. As discussed earlier, it will be necessary to implement a deviation to the WCA 3A regulation schedule. In order to achieve dry conditions for subpopulation A, the outflow from WCA 3A will be reduced before the levels in WCA 3A are below regulatory zones. This will require approval of a deviation to implement early closure of the S343's, S-344 and S-12 A & B. The upper level of Zone E will be lowered by 0.50 feet similar to the Zone E deviation used in the spring of 1999. By continuing the operation of S-12 C and D and S-333, additional storage is gained in WCA 3A to help offset the reduction in outflow capacity during the nesting season. This action would help increase flexibility to keep S-12 A & B closed until the end of the nesting season. Changes to the Lake Okeechobee or WCA 1 regulation schedules will likely not be necessary if the La Nina conditions remain through the dry season.

Modified South Dade Conveyance System

Operational changes to the ENP/South Dade Conveyance System (ENP/SDCS), similar to those used in 1998 and 1999 will also be employed. Water will be released from WCA 3A via S-151 to either C-6 or the south Dade Conveyance system via L-30 and L-31N. Water may be passed from WCA 3A and 3B via S-333, S-355A, S-355B, and G-69. This will help offset early reduction in outflow via the S-343's, S-344, S-12A and S-12B. In addition, the new temporary pump and buffer area will allow the increased operation of the S-333 structure to bring more water into the south Dade system. Specific components include modifying the trigger at G-3273 such that when G-3273 is below 6.8 flows would be passed into NESRS. When G-3273 is at or above 6.8, flows from S-333 would be passed through S-334, G211, and S-331 and removed via either S-332B and/or S-332D. Discharges from S-332B would be directed into a buffer area about one half

mile west of L-31N within the footprint of the C-111 project. In addition, S-197 operations will be modified to allow limited discharges from C-111.

CONTINUED COORDINATION

In implementing the ISOP, the Corps will continue coordination with the FWS and other agencies and specialists as needed to ensure that the conditions for the sparrow are optimized. It is unlikely that one set of operational rules will best ensure recovery of the CSSS. Therefore, this continued coordination will be necessary to jointly determine the best course of action. Any recommendations for further deviations from normal operations as well as for actions, within existing legal constraints, which best promote the health of the sparrow populations will be forwarded to the Jacksonville District Engineer for consideration.

TESTING AND MONITORING

The wet conditions leading into the year 2000 provide an excellent opportunity to test several hydrologic relationships important to the Cape Sable seaside sparrow habitat such as the effectiveness of the proposed temporary modifications to the Tram Road and the effectiveness of the modifications to the south Dade Conveyance system. The tests can help measure and quantify the effectiveness of the various operational and structural changes needed to ensure the recovery of the sparrow. Additionally, the information from the tests can be important in the verification of model modifications. The information gathered over the next few months will be included in the annual report by the Corps to the FWS and will be invaluable in the future, as requirements become more stringent to protect and improve the sparrow habitat.

MODELING REQUIREMENTS

Several modeling exercises are incorporated in this year 2000 ISOP. Measures to protect the subpopulation A from surface water flooding and the use of the L-67 Extension canal are not readily modeled using the 2x2 model. These new features and operations require extensive rewrites of the 2x2 code that will be accomplished by South Florida Water Management District personnel. The results from testing and monitoring over the next few months can be used to validate the model modifications. Furthermore, the 2x2 model will be used to determine system-wide impacts of operational changes of other new scenarios. 2x2 modeling will be supplemented by groundwater modeling that will be used to determine localized hydrologic effects of the operational scenarios. 2x2 modeling will also be used to predict future outcomes of various scenarios throughout the year as weather conditions and forecasts change. In addition to these specific requirements, a comparative analysis of G-3273, G-3272, G-596, and Angels Well will be accomplished.

IMPLEMENTATION SCHEDULE

1. Complete initial coordination by 10 December.
2. Issue letter to SFWMD regarding maximizing discharge to tide by 13 December.
3. Modify regulation schedule for WCA 3A to address early closure of S-12's by 14 December.
4. Close S-344, S-343 A & B, S-12A by 15 December.
5. Submit proposed plan along with application to DEP for temporary operating permit for S-332D by 15 December.
6. Begin S-332D operation by 28 December.
7. Open culverts in L-67 Ext borrow canal by 15 December. Analyze removal of culverts altogether. If found necessary, remove culverts by 29 December.
8. Finalize new temporary pumps (S-332A&B) plan by 29 December.
9. Close S-12B by 29 December.
10. Complete initial modeling of proposed plan by 1 February.
11. Complete Plans and Specifications for new temporary S-332B and buffer area in C-111 footprint by 4 January.
    a) Apply for DEP temporary operating permit for S-332B by 4 January.
    b) Advertise temporary pump and buffer area plan by 6 January.
    c) Open bids by 11 January.
    d) Award contract by 13 January.
    e) Notice to Proceed by 18 January.
    f) Commence construction by 25 January.
    g) Complete construction by 12 April.
12. Hold public meeting on overall plan by 6 January.
13. Initiate operation of S-333 under new operating criteria by 7 Jan.
14. Initiate operation of S-197 by 7 Jan.
15. Sandbag/Close culverts under Tram Road by 7 January 2000 or when flow patterns become east to west. Determine if pumps are needed and install at time of culvert closure. Determine need to sandbag low spots on Tram Road to prevent overtopping and complete as necessary by 7 Jan.
16. Monitor/check recession at NP-205 beginning 3 January to determine closure timetable for S-12C & D based on 1 March target.
17. Check levels of WCA 3B and L-29 Canal to determine operational capability of S-355A&B.
18. Complete evaluation of pumping over L-67 Extension by 1 February.
19. Complete evaluation of G-3273, G-3272, G-596 and Angels Well by 28 January.
20. Implement operations that are hydrologically equivalent to Test 7 Phase 2 by 1 March 2000.
21. Monitor recession of WCA 3B and determine if/when L-67 A gap can be reopened.